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Fig.1

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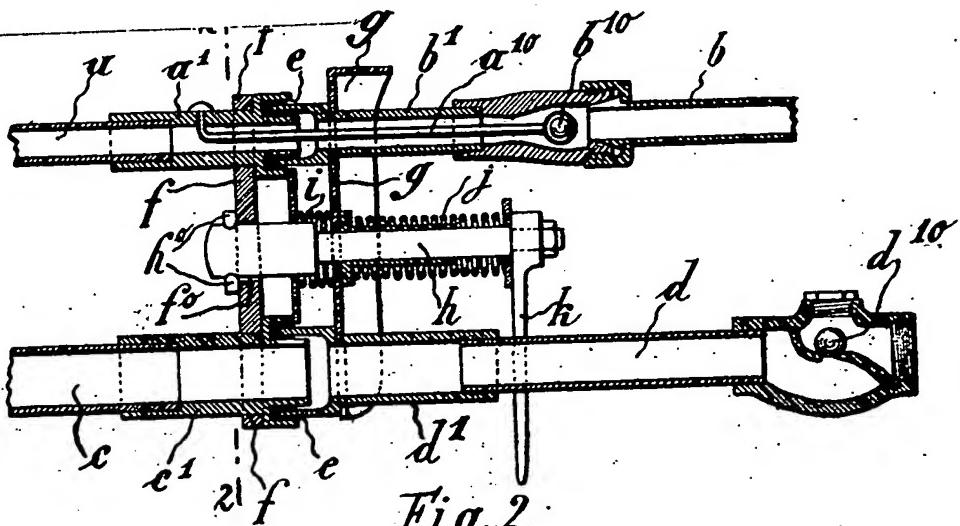


Fig. 2

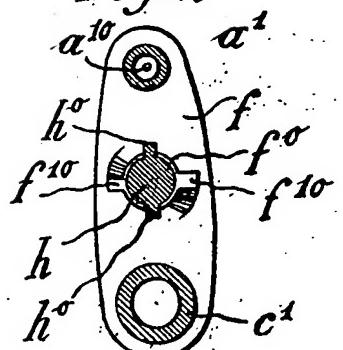
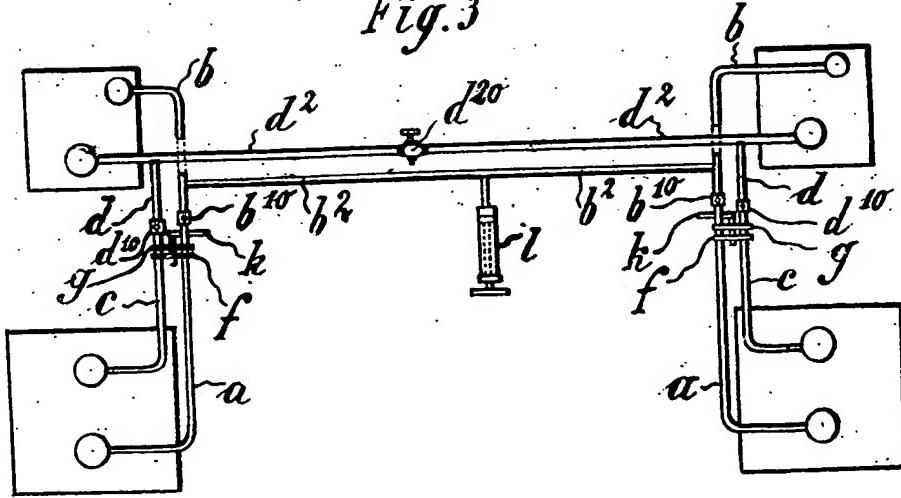


Fig. 3



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## PATENT



## SPECIFICATION

*Convention Date (France), Nov. 2, 1917.**Application Date (in the United Kingdom), Feb. 19, 1918. No. 2939/18.**Complete Accepted, Aug. 7, 1919.*

## COMPLETE SPECIFICATION.

**Improvements in or relating to the Arrangement of Detachable Fuel Tanks for Vehicles, Aeroplanes or like Machines**

I, RENÉ CAUDRON, of 52—70, rue Jean-Jacques Rousseau, Issy-Les-Moulineaux (Seine), France, Manufacturer, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:

- 5 This invention relates to an arrangement for connecting one or a plurality of reservoirs or fuel tanks with the engine or other apparatus and it concerns more particularly a detachable connection to be utilised aboard flying machines.
- 10 It has for its object to enable the connection of a fuel tank or tanks to be arranged in such manner that if for any reason a tank is to be cut out of action, for example if it is set on fire, it may be instantly detached and liberated so as to be dropped overboard without detriment to the machine.
- 15 To this end this invention consists generally speaking, in connecting or grouping the junctions or feed pipes leading from the fuel tank and the corresponding ends or pipes to be attached thereto by means of a contrivance comprising on the one hand two members, one integral with the terminals of the said feed pipes or their sockets, and the other integral with the corresponding terminals or sockets of the pipes to be attached thereto, and on the other hand a device adapted in one position to cause the two members to approach one another and thereby to establish and lock the connection between the
- 20 corresponding pipes and in another position to separate the two members and, consequently, to disconnect the terminals of the said pipes, as will be more clearly understood from the accompanying drawings, showing, by way of example, a constructional form of the invention as applied more particularly to aeroplanes.
- 25 Figures 1 and 2 of this drawing show respectively in vertical section and in transverse section on the line 2—2 of Figure 1 a connection constructed according to this invention.
- 30 Figure 3 shows in plan view diagrammatically an installation for feeding the twin engines of a flying machine with carburetted air, utilising a connection according to this invention.
- As shown, the fuel tank is provided with a feed pipe *a* to be attached to the pipe *b* for the admission of compressed air, and with a feed pipe *c* to be attached to the pipe *d* leading to the carburettor. These feed pipes *a* and *c* are arranged parallel and at a short distance one from the other.
- 35 The extremities of the pipes *b* and *d* which are to be connected to the ends [Price 6d.]

of the said feed pipes, are likewise parallel one with the other and at the same distance one from the other as the ends of the said feed pipes.

Secured by preference to the end of each feed pipe  $a$  and  $c$  is a gland  $a^1$ ,  $c^1$ , respectively, each having its outer end formed with a female connecting element. Arranged on the extremity of each pipe  $b$  and  $d$ , respectively, is a gland  $b^1$ ,  $d^1$ , each terminating in a male member. Inserted in the female portion of each joint is a plastic substance  $e$  adapted to render the joint airtight when the opposite members thereof are in engagement one with the other. 5

The two glands  $a^1$  and  $c^1$  are fitted each in an opening arranged for this purpose in a plate  $f$  which is soldered to the glands and serves to maintain 10 the proper distance between them. Arranged in this plate  $f$ , moreover, preferably midway between the two glands, is a circular opening  $f^0$  with diametrically opposed extensions or slots  $f^{10}$ .

The two glands  $b^1$  and  $d^1$  are likewise fitted each in an opening arranged for 15 this purpose in a member  $g$  which is integral with the body of the aeroplane and which is rigidly connected to the said sockets. Provided in this member  $g$ , moreover, co-axially with the opening  $f^0$  in the plate  $f$  is a central opening fitted in which with slight friction is a cylindrical rod  $h$ , provided with an enlarged head adapted to move with slight friction in the opening  $f^0$  of the member  $f$ . Arranged on this head are radial projections  $h^0$  capable of engaging 20 with the notches  $f^{10}$  in the member  $f$ .

Arranged on the rod  $h$  and supported between the member  $g$  and a fixed washer or plate bearing on the female gland portions is a coil spring  $i$ , and on the opposite side is a coil spring  $j$ , one end of which is supported against the member  $g$  and the other end of which bears against a circular washer secured 25 on the rod  $h$ , which at this end carries a hand lever  $k$ .

As will be seen, when the lever  $k$  is brought into a position such, that the lugs  $h^0$  register with the notches  $f^{10}$ , and pressure is then exerted by which the spring  $i$  between the plates  $f$  and  $g$  is compressed, the lugs  $h^0$  are caused to pass through the notches  $f^{10}$  and then by rotating the lever  $k$  and, consequently, 30 the lugs  $h^0$  the connecting device is locked, ensuring the connection of the piping, while the tight fit of the joint is maintained by the pressure exercised by the spring  $j$ . When thereafter the lever  $k$  is swung round to cause the lugs  $h^0$  to register with the notches  $f^{10}$ , and released the disengagement of the parts will be immediate, because the spring  $i$  forces the plates  $f$  and  $g$  apart. 35 These manipulations are greatly facilitated by the provision on the outer faces of the notches  $f^{10}$  of helicoidal surfaces, so that the rotation of the lever  $k$  in the locking or releasing sense causes the projections  $h^0$  to be screwed up with or unscrewed from the said notches respectively.

In fact, in locking the parts by acting on the lever  $k$ , the projections  $h^0$  40 ride up the helicoidal faces, thereby ensuring the compression of the spring  $j$  and, consequently, the tightening up of the joints.

By means of this arrangement, if the fuel tank of the engine is set on fire, the pilot is able instantly to disconnect it from the air pump and from the engine and drop it overboard. 45

Where the aeroplane carries an auxiliary fuel tank or is provided with several engines each supplied from its individual fuel tank, the arrangement may be such that if one of the tanks is dropped overboard, the engine may still be supplied either from the auxiliary reservoir, or from the reservoir of the other engine. 50

To this end it is advisable when the feed pipes  $a$  and  $c$  are disconnected from the pipes  $b$  and  $d$ , to cause the latter automatically to be closed in order to prevent the compressed air and the fuel from escaping therethrough. To this end a valve, for example a ball valve  $b^{10}$ , is arranged inside the end or socket of the pipe  $b$ , tending to close under the action of the compressed air flowing 55 through this pipe towards the tank, and in the corresponding end or socket  $a^1$  of the pipe  $a$  is secured a rod  $a^{10}$ , so that when the pipe  $b$  is connected to the

- pipe  $a$  the rod  $a^{10}$  is caused to hold the ball valve  $b^{10}$  away from its seat, as shown in Figure 1. For the same purpose the pipe end  $d$  is provided with a ball valve  $d^{10}$  adapted to be opened only by the action exerted thereon by the fuel under pressure admitted from the pipe  $c$  and counteracting any return of the fuel from the pipe  $d$  into the tank. In the case of twin engines the two pipes  $d$ , as shown in Figure 3, which connect the fuel tanks to the carburettors of their engines, are connected by a pipe  $d^2$ , and the latter is by preference provided with a valve  $d^{20}$  adapted either to establish communication between the two engines or to interrupt any relation between them, if desired.
- 10 It will be seen that if one of the tanks be alight, it suffices to actuate the lever  $k$  in order to sever its connection from the respective engine when the valves  $b^{10}$  and  $d^{10}$  are automatically closed, after which it is sufficient to open the valve  $d^{20}$  in order to enable the tank of the other engine to feed the engine which has been deprived of its feed tank.
- 15 Moreover, in the twin arrangement it is advantageous to connect also the pipes  $b$  by a conduit  $b^2$  enabling the air in the two tanks to be compressed by means of a common pump  $l$ , as soon as the engine is started; this connection may be utilised in the case of a stoppage of one of the air pumps.
- 20 As will be readily understood, this invention is not to be held limited to the specific construction hereinbefore described with reference to the drawings, but is intended to cover all such modifications as will be obvious to those skilled in the art, without departing from the spirit thereof.
- Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that
- 25 what I claim is:—
1. An arrangement for connecting a fuel or like tank to the engine or other part of a machine, such as an aeroplane, consisting in connecting the feed pipes of the tank with the junction pipes leading to the engines or other parts by a contrivance comprising two elements, one integral with the ends of the feed pipes, and the other with the ends of the junction pipes, and mechanism adapted in one position to effect the connection of the said parts, and in another position the disconnection thereof by requisite movements of the two elements.
  - 30 2. An arrangement as claimed in Claim 1 in which one the one hand the two elements of the connecting contrivances are constituted by plates or the like, each provided with a circular opening co-axial one with the other, the opening in one of the plates being enlarged by radial recesses, and on the other hand by a rod passing through the co-axial openings and at its free end provided with projections adapted to pass through the recesses, and after rotation of the rod by means of a hand lever or the like to lock the two members in their connecting position.
  - 35 3. An arrangement as claimed in Claim 2 wherein the rod adapted to connect the two members is under the influence of a spring tending to disengage it from it from the plate or member secured to the feed pipes.
  - 40 4. An arrangement as claimed in Claim 2 having a spring interposed between the two plates or members tending to force the latter one from the other.
  - 45 5. An arrangement as claimed in Claim 2 in which the plate or member which is integral with the feed pipes has one of its faces provided with helicoidal inclines adapted to guide the locking projections of the rod as the latter is actuated.
  - 50 6. An arrangement as claimed in Claim 1 or 2 in which one of the pipes or pipe sockets is provided with a stem adapted, in the connected position of the parts, to open a valve arranged in the corresponding pipe connection and influenced in the closing sense by the action of the fluid pressure.
  - 55 7. An arrangement as claimed in Claim 1 or 2 in which the feed pipe leading from the fuel tank to the carburettor is provided with a non-return valve.
  8. An arrangement as claimed in Claim 1 or 2 for two separate fuel tanks of

which one becomes disabled, having the feed pipes of the separate tanks connected between them and so controlled by a valve or the like as to enable the engine or engines to be fed from the remaining tank.

9. An arrangement for connecting the feed pipes of a fuel tank or tanks to the pipes of the engine or apparatus supplied therefrom, constructed and operating substantially as described and shown in the accompanying drawings. 5

Dated this 19th day of February, 1918.

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